UNUSUAL MANIFESTATIONS OF *SALMONELLA* INFECTION

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INTRODUCTION

Salmonella infection is universally prevalent and the infection most common in the first year of life (Krugman *et al.*, 1977; Yoshikawa *et al.*, 1980). Clinically, there are four main types of presentation: gastroenteritis is the most common, enteric fever (typhoid and paratyphoid fever), septicemia with or without localized infections and the carrier state (Saphra and Winter, 1957; Black *et al.*, 1960; Krugman *et al.*, 1977). Focal or local manifestation with salmonella infections include : abscesses in any organ, pneumonia, pleurisy, empyema, meningitis, infection of bone and joints, infection of the urinary tract, appendicitis, cholecystitis, peritonitis, salpingitis, tonsillitis, otitis media, even aortic aneurysm, endocarditis or pericarditis (Saphra and Winter, 1957; Black *et al.*, 1960). This report concerns a year old child who presented with pancytopenia, bronchopneumonia mucous bloody diarrhea and generalized lymphadenopathy most likely due to salmonella infection.

Case report

A one-year old girl was admitted to Haadyai Hospital, Songkhla on September 9, 1980 with a history of fever and increasing pallor for about one month. Ten days before admission, she was admitted to Yala Hospital with a history of fever and pallor. She failed to improve with penicillin therapy and subsequently developed generalized purpura and had profuse epistaxis. Pancytopenia was detected and blood transfusion was given. There had been no exposure to other drugs, toxic substances or to radiation. When seen at Haadyai Hospital, she looked sick, pale, miedly dehydrated and grossly underweight (body weight 6 Kgs) with petechiae and purpuric spots all over the body and extremities. The liver was palpable 2 cm below right costal margin. It was smooth and not tender. The spleen was not palpable. The rest of the examination was unremarkable.

Laboratory data at the time of admission (2 days after blood transfusion at Yala Hospital) were as follows : hemoglobin 8.6 g/dl, hematocrit 27%, white blood cell count 3,050 per c.mm; neutrophils 24%, lymphocytes 72 % and monocytes 4 %. Peripheral blood smear showed two population of red blood cell, one was hypochromic microcytic while the other was normochromic and normocytic. Platelets were estimated on blood smear to be markedly decreased in number. Urine and stool examinations were within normal limits. Bone marrow aspiration revealed a hypercellularity. The myeloid series were increased with a shift to the left. There was an apparent increase in immature forms especially myelocytes and metamyelocytes, and a few mature neutrophils was present. The erythroid series were slightly increased with some megaloblastic change. Many histiocytes with some clustering were seen. The megakaryocytes were decreased. A chest roentgenogram showed bilateral bronchopneumonia. The clinical course and treatment are summarized in Fig. 1.

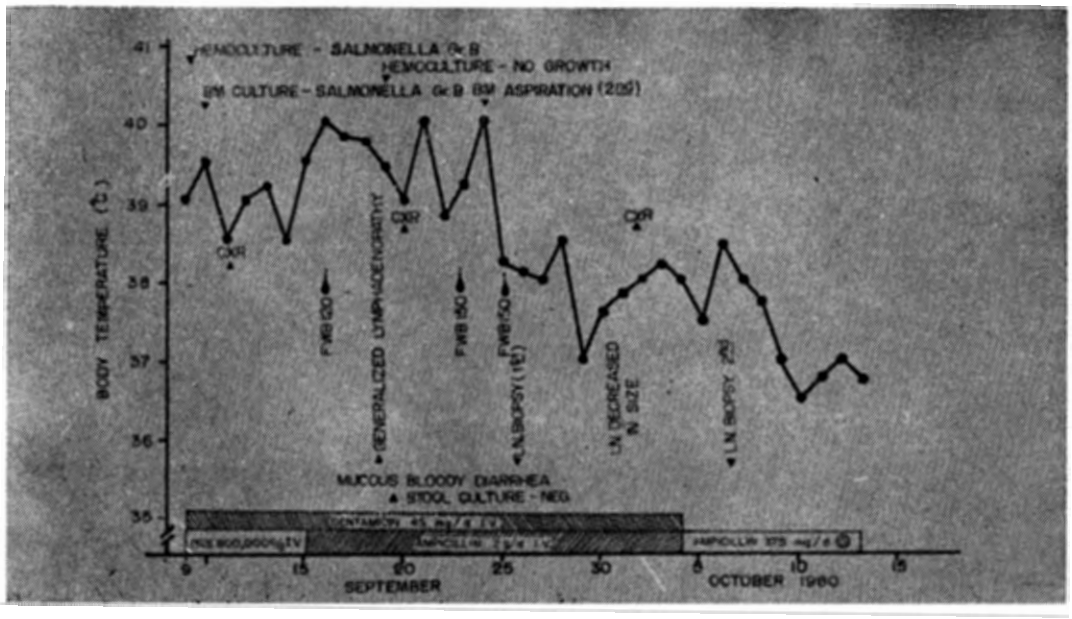

Fig. 1—Clinical course of a child with salmonella septicemia and pancytopenia.

Bm	=	Bone Marrow	Fwb	=	Fresh Whole Blood
Ln	=	Lymph Node	Cxr	=	Chest X-Rays

She failed to improve after penicillin and gentamicin therapy. Widal test for typhoid and paratyphoid were negative. *Salmonella* group B was cultured from the blood and bone marrow. Further serotyping of this organism was not available. The *Salmonella* was sensitive to ampicillin, cephalothin, colistin, gentamicin, kanamycin, streptomycin, cotrimoxazole and tobramycin. The antibiotic therapy was changed to ampicillin and gentamicin. On the sixth hospital day, she remained febrile and pale. The white count had fallen to 2,750 with 50 % neutrophils, 46 % lymphocytes and 4 % monocytes. The hemoglobin and hematocrit had fallen to 4.65 g/dl and 13 % respectively and the platelet count was 15,000 per c.mm. Two nucleated red cell was seen per 100 white blood cells. A fresh whole blood transfusion was given. Since megaloblastic changes were seen in the bone marrow 5 mg of folic acid was also given daily. Two days later, she developed mucous bloody diarrhea and had generalized lymphadenopathy. A firm, movable mass, 0.5 cm in diameter at the 6th left intercostal space in the mid axillary line was detected. This was presumed to be hyperplastic lymphoid tissue. Stool cultures were negative for pathogenic organism. Urine culture was not done. Chest roentgenogram showed improvement in the bronchopneumonia. On the eleventh hospital day, her hemoglobin had risen to 9.3 g/dl., hematocrit 26 %, white count 10,650 with 41 % neutrophils, 5 % bands, 4 % lymphocytes and 17 % monocytes. The platelet count was 36,000 per c.mm. Right cervical lymph node biopsy demonstrated loss of normal architecture with multiple areas of necrosis and hemorrhages as shown in Fig. 2. There was an increase number of large immature cells with prominent nuclei infiltrating the sinuses and medullary cords of the lymph node (Fig. 3).

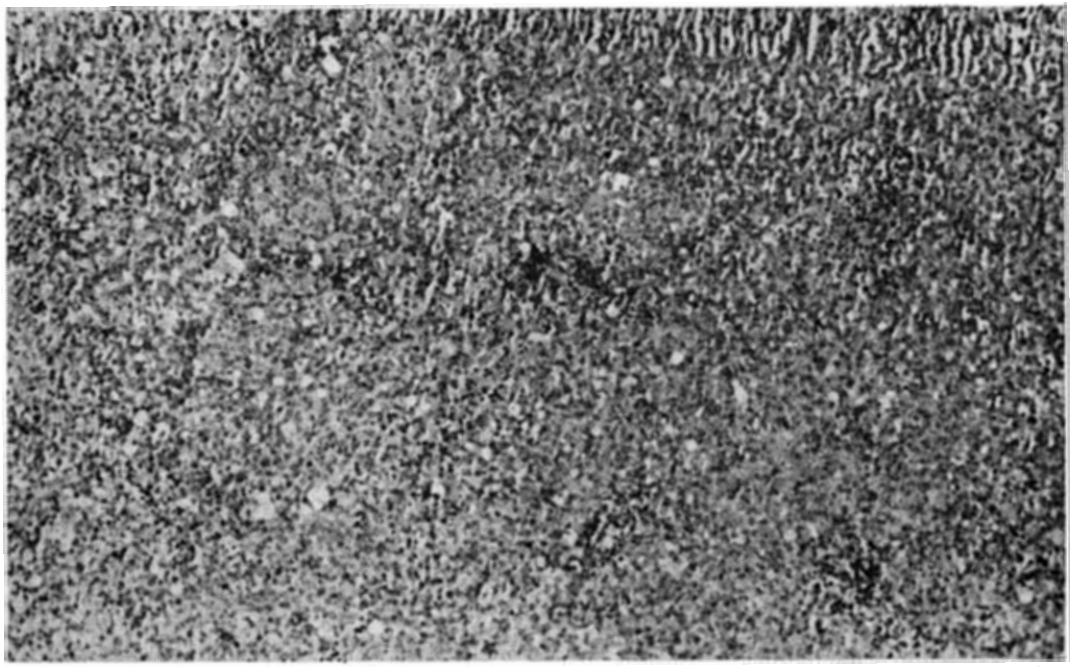

Fig. 2—Low magnification of the lymph node showing loss of normal architecture with diffuse infiltration of mononuclear cells with multiple areas of necrosis (N), (H & E section, × 130).

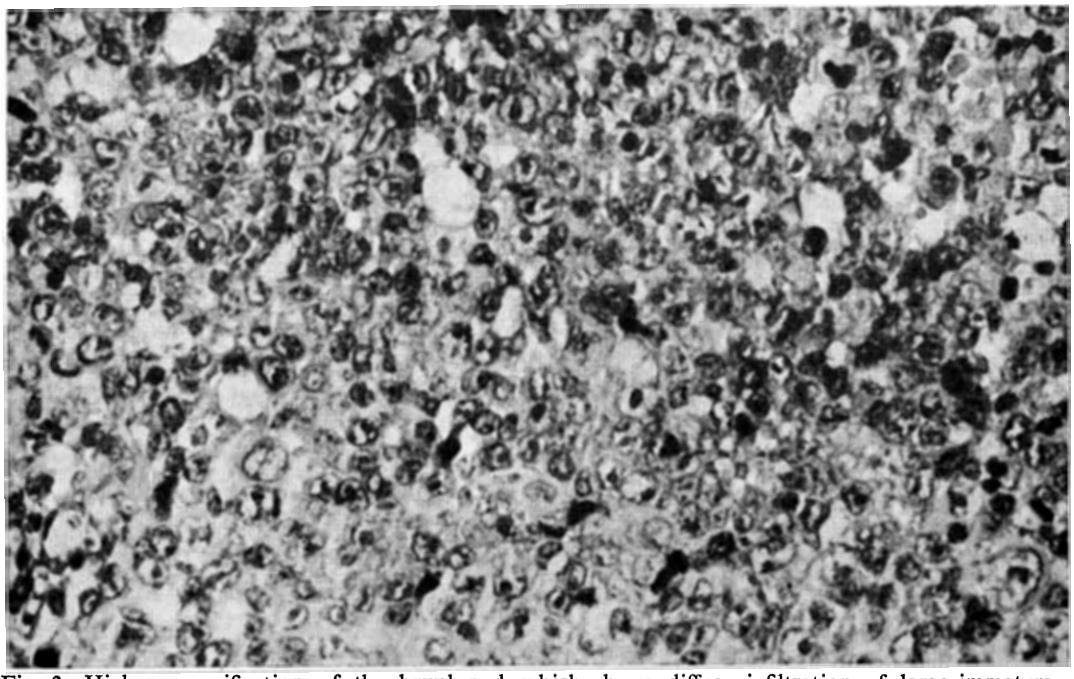

Fig. 3—Higher magnification of the lymph node which shows diffuse infiltration of large immature cells with prominent nuclei, (H & E section, × 520).

The diarrhea improved after blood transfusion and antibiotic therapy. Bone marrow aspiration was repeated on the 16th day of admission and showed myeloid hyperplasia only. Her CBC showed a hemoglobin of 14 g/dl, hematocrit 43 %, white count 5,300 with 46 % neutrophils, 31 % bands, 15 % lymphocytes and 8 % monocytes. Three nucleated red cell was seen per 100 white blood cells. Platelet count was 280,000 per c.mm. Repeated hemoculture showed no growth and chest roentgenogram normal. The purpura had disappeared.

The lymph nodes decreased in size and some disappeared two weeks after first detected. The mass on the left chest wall also disappeared. A repeat lymph node biopsy was done on the 26th day of admission and the histology revealed reactive hyperplasia. The patient remained well and was discharged from the hospital a month after admitted. The CBC at the time of discharge were as follows : hemoglobin 12.6 g/dl, hematocrit 36 %, white count 8,800 with 46 % neutrophils, 43 % lymphocytes, 5 % monocytes and 6 % eosinophils. The platelet count was 300,000 per c.mm. She remained well with normal blood counts during the next 15 months of follow up.

DISCUSSION

In this patient *Salmonella* were cultured from blood and bone marrow confirming the diagnosis of septicaemia. She also had transient bloody diarrhea, generalized lymphadenopathy, bronchopneumonia and pancytopenia. Lymph node biopsy showed multiple areas of necrosis and hemorrhage. There were also infiltration by large immature cells with prominent nuclei. The bone mar row was hypercellular. There was an increase of myeloid series with a shift to the left and megaloblastic changes. These features improved with supportive therapy (blood transfusion, folate) and parenteral antibiotics.

Salmonella septicemia occurs in about 5-10 % of salmonella infection (Saphra and Winter, 1957) and the patient often present with fever of unknown origin. This fever can spike up to 105.8°F (41°C) or may be continous simulating typhoid fever (Saphra and Winter, 1957). Splenomegaly is frequent. Diarrhea, if present, is usually mild and or is of short duration. Constipation is more frequent (Saphra and Winter, 1957). However, bloody diarhea which developed relatively late in our patient had been reported by others (Saphra and Winter, 1957).

Of the 7,779 salmonella infections report by Saphra and Winter, 1.1 % had respiratory infections particularly lobar or bronchopneumonia (Saphra and Winter, 1957) and more so in compromised host. Our patient had bronchopneumonia.

Leukocytosis with a shift to the left was found in most cases of salmonella septicemia (Saphra and Winter, 1957). Normal leukocyte count or leukopenia are more usual in salmonella infection (Lien-Keng and Odang 1959; Piankijagun *et al.*, 1977; Noyes *et al.*, 1978; Dhumavibhat *et al.*, 1978; Vanprapa *et al.*, 1980) especially in the neonates (Marcy, 1976). Anemia in patient with typhoid fever (Scragg *et al.*, 1969; Piankijagum *et al.*, 1977) can be due to : bleeding, underlying iron deficiency anemia, ineffective erythropoiesis (Piankijagum *et al.*, 1977; Noyes *et al.*, 1978), hemolysis (Piankijagum *et al.*, 1977; Noyes *et al.*, 1978) or increased red cell destruction by the reticuloendothelial system (Piankijagum *et al.*, 1977). In typhoid fever, thrombocytopenia is seen in 11-52% (Lien-Keng and Odang, 1959; Destaing and Granguad, 1965; Kienitz and Elliger, 1967; Scragg *et al.*, 1969; Piankijagm *et al.*, 1977) but frank bleeding is uncommon (Piankijagum *et al.*, 1977). Thrombocytopenia may be due to

increased platelet destruction by the RE system (Piankijagum *et al.*, 1977) or consumptive coagulopathy (Allen *et al.*, 1969; Satiadhanna and Kho, 1973). Our patient showed pancytopenia. There was no history of exposure to toxic substances, drugs or to radiation. Serum folate was not estimated. However, the presence of a megaloblastic marrow and a probable response to folate therapy suggests folate deficiency in our patient.

Generalized lymphadenopathy has not been reported in salmonellosis. The mesenteric lymph node in typhoid fever occasionally shows necrosis and hemorrhages with infiltration by large numbers of macrophages containing ingested cell debris and erythrocytes in the sinuses and medullary cords (Anderson, 1980). In this patient with salmonella group B septicemia the cervical lymph node demonstrated multiple area of necrosis and hemorrhage. The sinuses and medullary cords were infiltrated by large number of immature cells which may have been young lymphocyte or histiocyte. These features disappear after treatment.

In Thailand, salmonella infection is common. There has been no previous report of pancytopenia and generalized lymphadenopathy in association with salmonella group B infection.

SUMMARY

A case report a patient with *Salmonella* group B septicemia is presented. This patient had continous high fever for one month, bronchopneumonia, pancytopenia, mucous bloody diarrhea and generalized lymphadenopathy.

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